HUMAN BEHAVIOUR RECOGNITION, IDENTIFICATION, AND COMPUTER INTERACTION

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Human Motion Detection and Classification

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19.1 Introduction

Human Motion Detection is one of the most challenging problems in computer vision due to the huge quantity of possible cases. The number of postures depends on the degree of freedom of the human body (i.e. the articulations such as shoulders or knees). Moreover, the morphology of the person (height, corpulence, etc) influences the perception of the posture. Furthermore, clothes can also give different types of appearances for the same posture.

Another major problem is in segmenting the interest region (in this case, human beings) from the background. In the segmentation stage alone, there are many potential problems such as illumination variations and occlusions. Another important challenge that is being faced but still have not solved is the speed of the segmentation. Many robust methods have been proposed and implemented by many researchers but the speed of their systems leave much to be desired which means that their designs cannot be implemented in real time which is one of the most important criteria in surveillance systems.

After successfully segmenting the human bodies from the background, they need to be represented such that they are invariant to shifting, rotation, rescaling and other geometrical properties. Feature extraction, whose aim is to obtain the most suitable representation for the human postures has always been a huge challenge. Some researchers have come up with complex methods of feature extraction, but their methods have been proven to be impractical in many situations.

The process of 'teaching' the system (i.e. training the classifiers) to recognize human postures is the heart of a posture recognition system. However, most of the times, due to the inaccuracies in the segmentation stage, the inputs to the classifiers are less than optimal, creating a lot of problems in the classification stage.